9 - 2 Installing attracted pieces (5 - 149 and 5 - 155)

a. Charge the focal plane shutter.

b. Check the 2nd blind hook for depth of the engagement.
The depth of engagement should be a half or more of the tooth width of the cam plate (5 - 83) and the 2nd blind hook should not reach the tooth bottom.
When correction is required, loosen the screw (5 - 142) and adjust position of the iron core (5 - 143). When the adjustment is completed, be sure to retighten the screw (5 - 142).
When this engagement is insufficient, the 2nd blind will not be held correctly and a shutter speed faster than the selected shutter speed will be resulted.

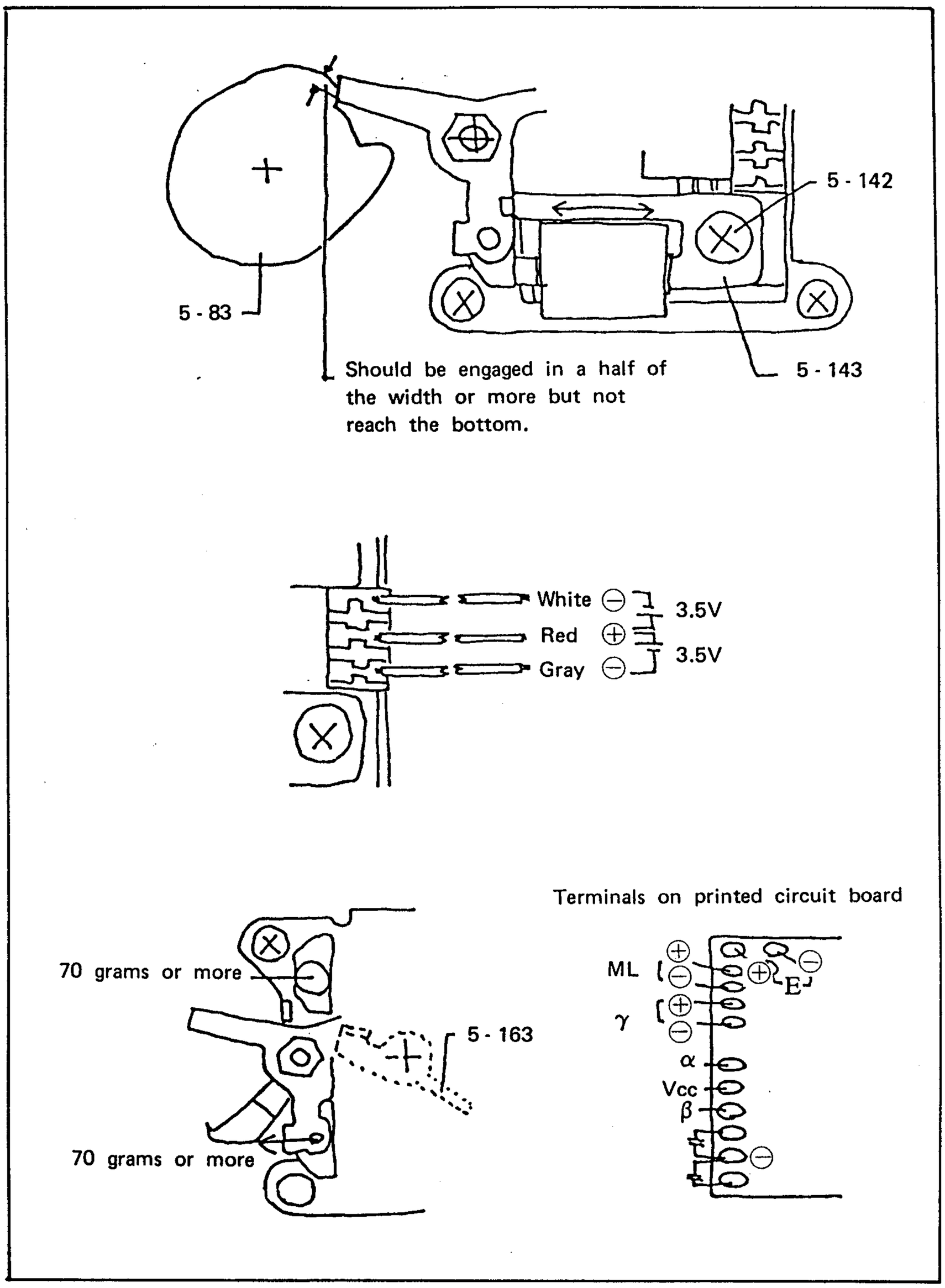
c. Apply DC 3.5V to the coils of the α and β magnet of the magnet base plate assembly (5 - 73).

d. Set the release lever (5 - 163) to the release position.

NOTE: When the camera is assembled completely, apply DC 3V to the terminals of the γ magnet. The release lever (5 - 163) will then be set to the release position.

e. Check attracting forces of both the α and β magnets.
At the attracted piece, the attracting force should be 70 grams or more. When correction is required, check the base plate for warping, check the magnet alone for attracting force, and repair or replace.
When attracting force is insufficient at the 1st blind side (α magnet), shutter speed will become too long, or when attracting force is insufficient at the 2nd blind side (β magnet), shutter speed will become too short.

Fig. 54

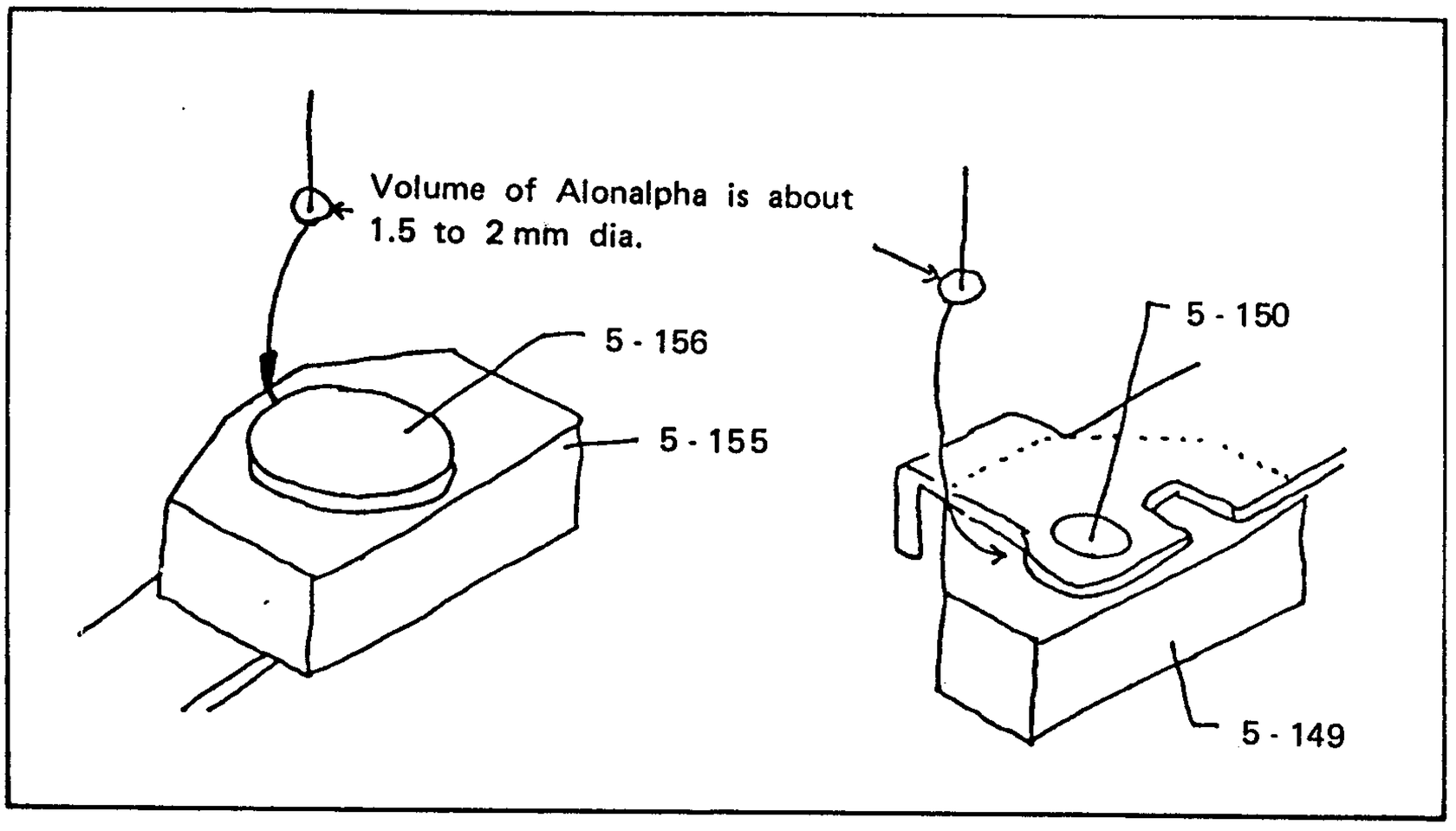

5 - 142
5 - 83
5 - 143
Should be engaged in a half of the width or more but not reach the bottom.
White
Red
Gray
3.5V
3.5V
70 grams or more
5 - 163
70 grams or more
Terminals on printed circuit board
ML
γ
α
Vcc
β
E

f. Install the attracted pieces (5 - 149 and 5 - 155) with Alonalpha (adhesive) as described below.

- ○ Wind up the focal plane shutter completely.
- ○ Apply DC 3.5V to α and β magnets.
- ○ Set the release lever (5 - 163) to the release position.
- ○ Now, install the attracted pieces with Alonalpha.

CAUTION:
- ○ Do not apply Alonalpha excessively.
- ○ Hold the attracted pieces as they are at least 10 seconds after installing them.
- ○ Be careful not to allow Alonalpha impregnating into the attracted surface. Be sure to impregnate Alonalpha between the attracted piece supporting shaft (5 - 150, 5 - 156) and attracted piece (5 - 149, 5 - 155).
- ○ To wipe off Alonalpha, use acetone $(CH_3)_2CO$.

Fig. 55


Volume of Alonalpha is about
1.5 to 2 mm dia.
5 - 156
5 - 155
5 - 150
5 - 149

10. Adjustments of shutter blind traveling velocity and shutter speed

For the rated values, refer to the table shown in the right hand page.

10 - 1 When the amplifier built in the camera is not used.

a. Use a standard time generator.

b. Connect the standard time generator to the M - circuit board assembly (2 - 64) by soldering lead wires.

c. Apply signal of 1/60 sec. (15.6 ms), and adjust traveling velocities of the 1st and 2nd blinds respectively to 12.0 msec and 12.8 msec.

NOTE: At 1/1000 sec. shutter speed, traveling velocity of 2nd blind is also 12.0 msec.

d. Apply signals of 1/500 sec. and 1/1000 sec. to the camera, and select a capacitor (7 - 43) having the adequate capacity so that the rated values are satisfied.

NOTE: At 1/1000 sec. shutter speed, try your best to obtain 1.0 msec.

- Match traveling velocity of the 1st blind with that of the 2nd blind.
- Note that when the traveling velocity of the 2nd blind is matched with that of the 1st blind at 1/1000 sec. shutter speed, the traveling velocity of the 2nd blind becomes slower than that of the 1st blind at a slower shutter speed. For example, it will become about 0.8 msec. slower at 1/60 sec. shutter speed.

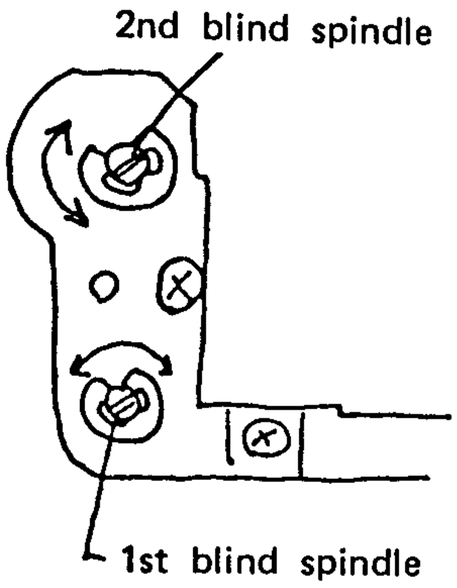
e. When 0.5 msec. is measured with 1/500 sec. shutter speed signal applied to the camera without using capacitor, it is most ideal.
When 0.5 msec. is not measured, add a capacitor after checking the followings.

- Overlap value of the metal fixtures of the 1st and 2nd blinds.
- Attracting force of the β magnet (for 2nd blind)
- Position of the stop lever (5 - 159).

f. Adjustment of synchro - delay time (X - contact)

- Rating for inspection: 0.4 msec. to 2.0 msec.
- Adjust it by bending the contact piece (5 - 138) at 1/60 sec. shutter speed.

Fig. 56



Traveling velocity of the blind becomes faster as the spindle is turned clockwise.

Traveling velocity of the blind becomes slower as the spindle is turned counterclockwise.

Unit of measure ms

Shutter speed	Adjusting range	Standard for inspection	Standard for exported model
$\frac{1}{1000}$	0.8 — 1.25	0.65 — 1.37	0.58 — 1.64
$\frac{1}{500}$		1.43 — 2.67	1.16 — 3.28
$\frac{1}{250}$		2.86 — 5.37	2.32 — 6.57
$\frac{1}{125}$		5.92 — 10.7	4.65 — 13.1
$\frac{1}{60}$		11.4 — 21.3	11.0 — 22.1

Fig. 57

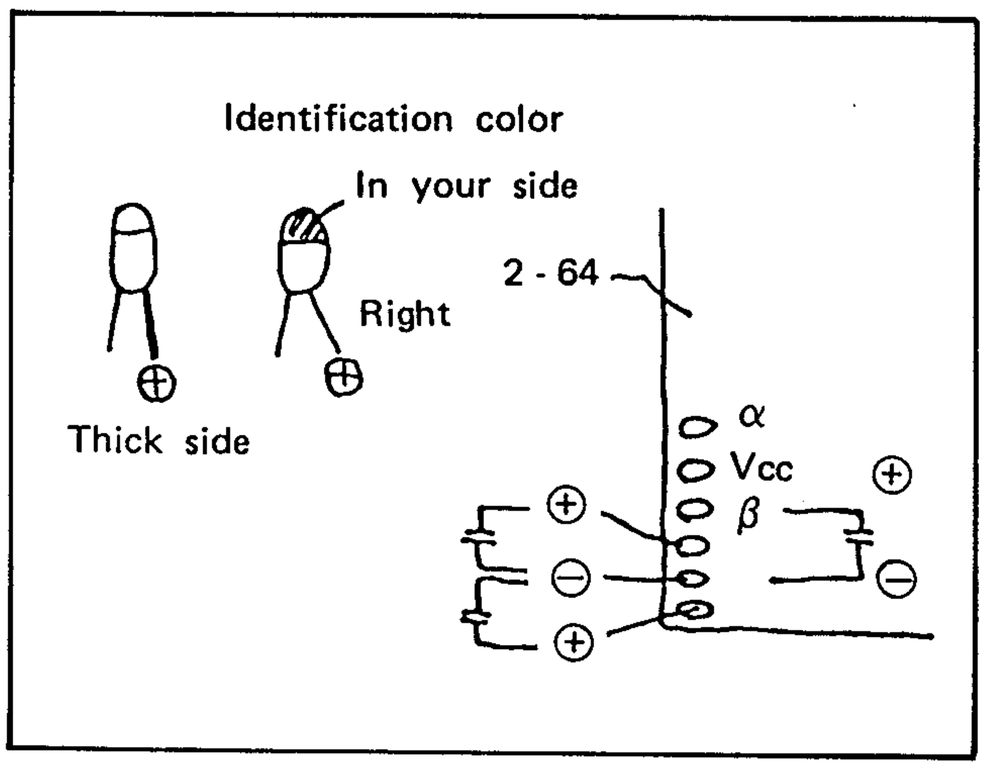
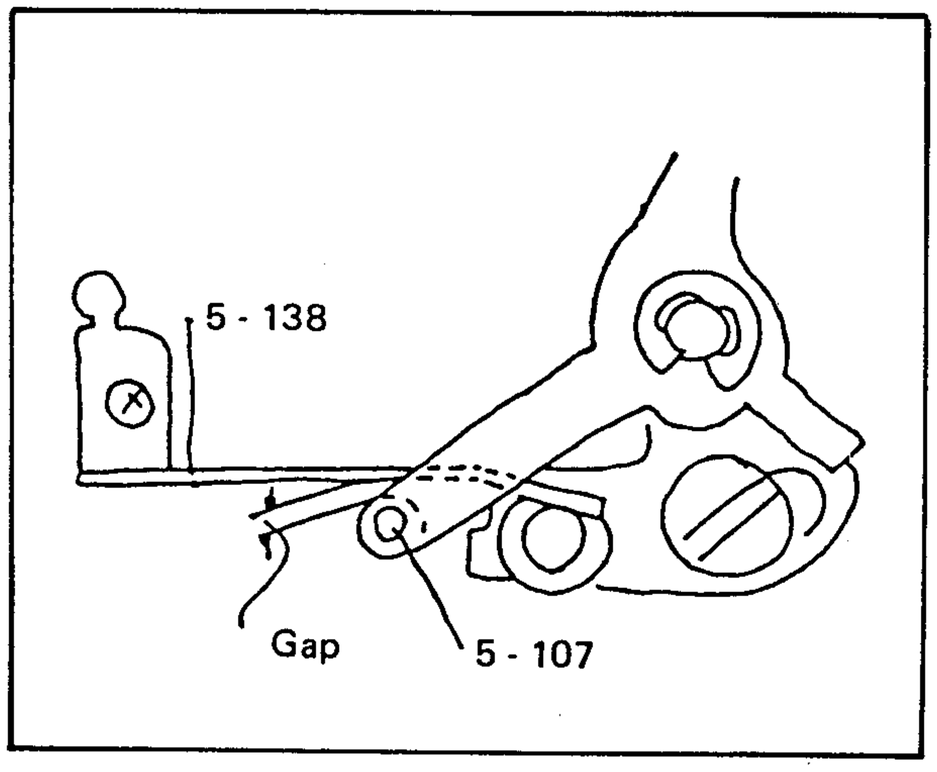


Fig. 58



10-2 When the amplifier built in the camera is used.

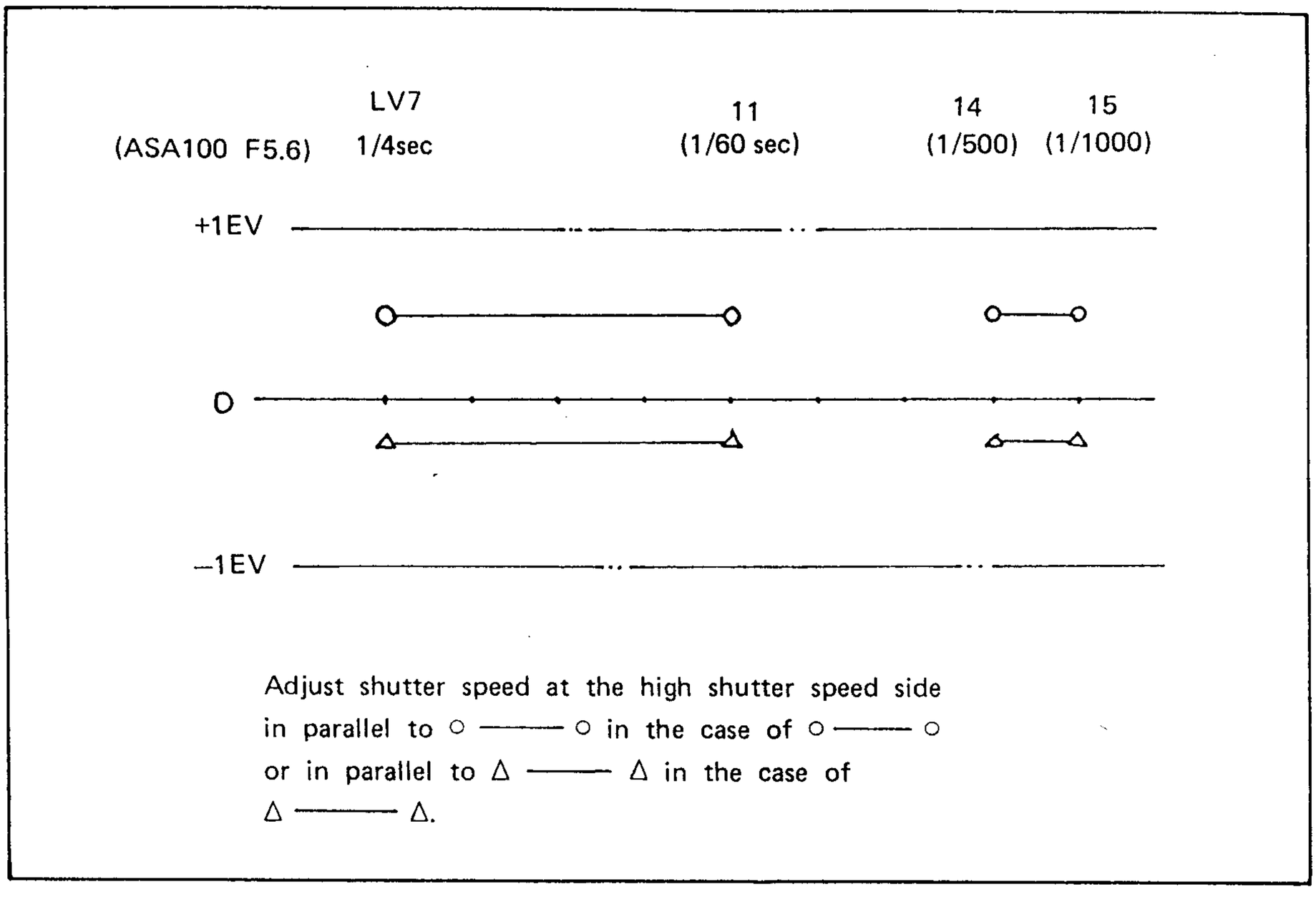
a. Use a shutter tester and adjust 1st and 2nd shutter blind traveling velocities and shutter speed as indicated below.

- ○ Set the shutter speed selector dial to 1/60 sec.
- ○ Adjust 1st and 2nd shutter blind traveling velocities to 12.0 msec. and 12.8 msec. respectively.
- ○ Set the shutter speed selector dial to "AE", and move the aperture transmission ring properly so that the LED between 1000 and 500 flashes in the viewfinder.
- ○ With the shutter release button depressed in a half way (AEL mode), select a proper interval capacitor sot that the shutter tester counts about 0.8 msec (1 msec to 0.6 msec.).

b. Checling exposure value

- ○ With an exposure tester, measure exposure levels at LV11 and LV7.
- ○ Select a proper interval capacitor so that exposure levels at LV14 and LV15 are in parallel to the exposure levels measured as above.
  When correcting center value (level), adjust level of the amplifier.

Fig. 59



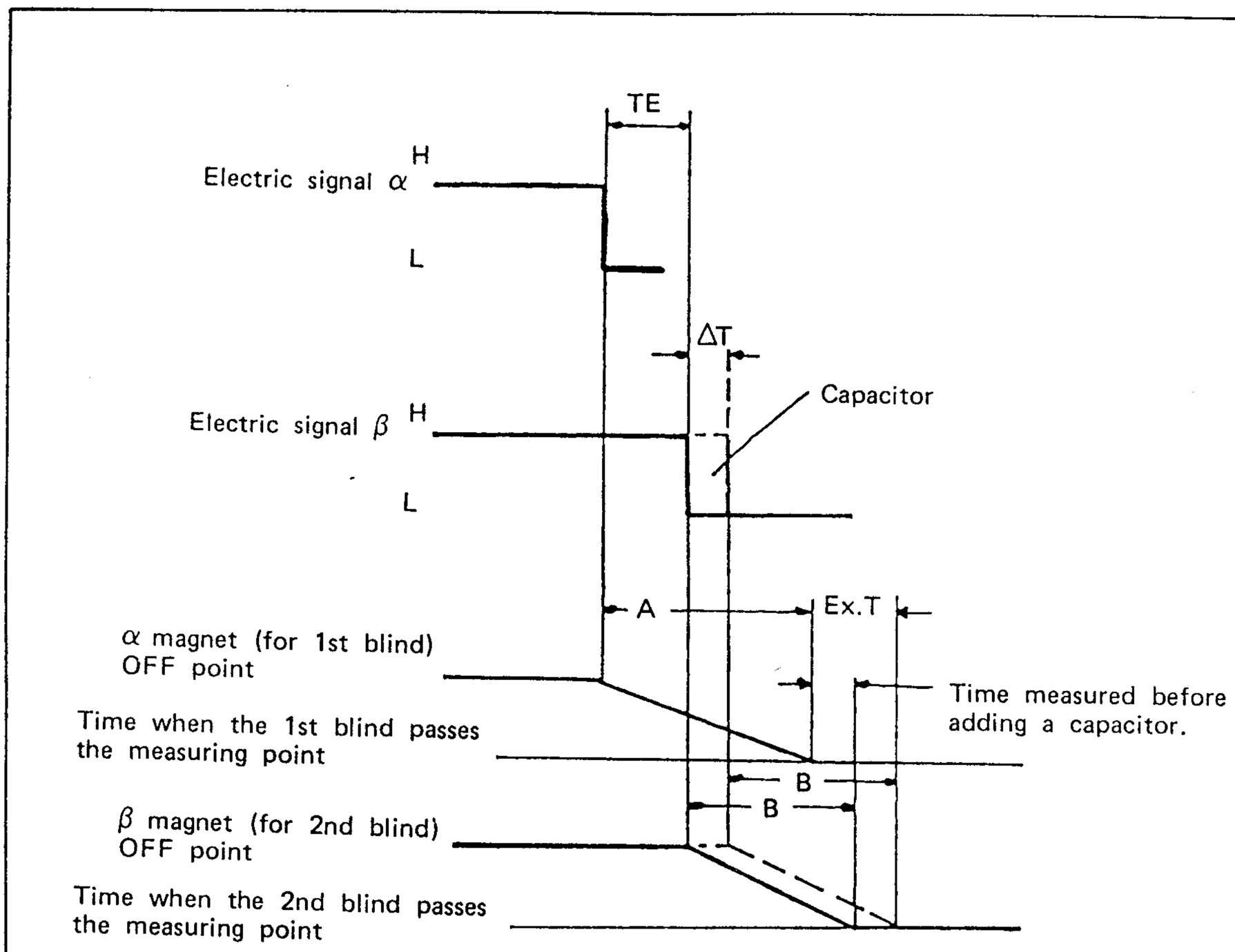
Adjust shutter speed at the high shutter speed side in parallel to ○ ——— ○ in the case of ○ ——— ○ or in parallel to △ ——— △ in the case of △ ——— △.

10 - 3 Capacitor (7 - 43)

- The 1st and 2nd blinds are controlled by electric signals α and β respectively.
- Electrically, 1 msec. time deviation always exists between the α and β signals at 1/1000 sec. shutter speed.
- Mechanically (relationship between magnet and shutter blind), the time required by the 1st blind in passing the time measuring point differs from that by the 2nd blind, and time required by the 2nd blind is 1.5 to 1.0 msec. shorter than that by the 1st blind.
- A delay time provided by a capacitor is added to the actual time provided by the amplifier by applying the capacitor to the β signal line so that the time difference of the amplifier is balanced with that of the shutter blind.
- Capacitors of the following capacities are available for this purpose.

  0.047 μF
  0.068 μF
  0.1 μF
  0.22 μF
  0.33 μF
  0.47 μF

Fig. 60



$A > B$ $\quad A - B \fallingdotseq 1.5$ ms

When $A = B$, $T_E = Ex.T$

Adjust ΔT so that $B + \Delta T = A$.

10-4 Typical examples of trouble and probable causes

a. Approximately 15 msec. are counted at 1/1000 sec.

Cause: ○ Coil of α magnet (for 1st blind) is broken or attracting force of the α magnet is insufficient.

b. Shutter blind does not open.

Cause: ○ Coil of β magnet (for 2nd blind) is broken or attracting force of the β magnet is insufficient.

○ Insufficient claw engagement.

Corrective action: ○ To recover attracting force of the magnet, clean the attracted piece.

○ Set shutter speed to "B" to move the iron core to the attracting position, and with the shutter speed "B" maintained, retighten the set screw.

c. Both the 1st and 2nd blinds do not run.

Cause: ○ γ magnet does not operate.

○ Improper position of the stop lever (5-159)

○ Relase lever (5-163) does not operate.

d. 1/1000 sec. shutter speed fluctuates.

Cause: ○ Insufficient attracting forces of α and β magnets.

○ Insuffucuent holding forces of α and β magnets.

○ Attracted piece is not fixed securely.

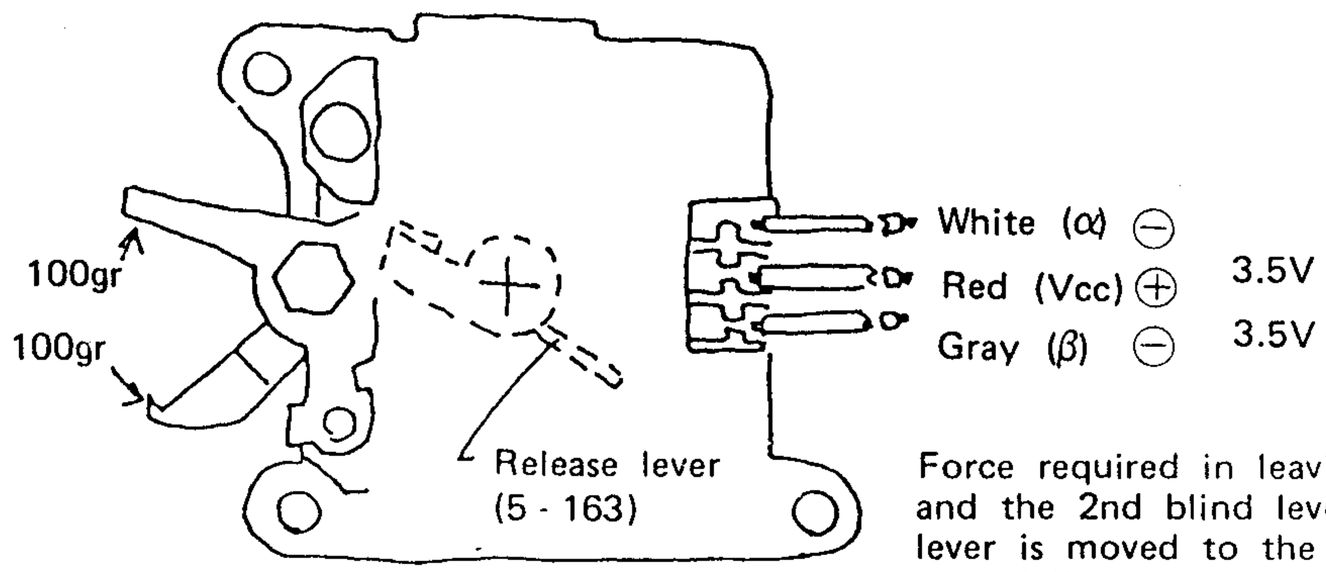
e. The 1st blind opens when wound up rapidly.

Cause: ○ Insufficient engagement of 1st blind hook and improper height.

○ Release lever (5-163) of the magnet moves when winding up the shutter blind.

Fig. 61

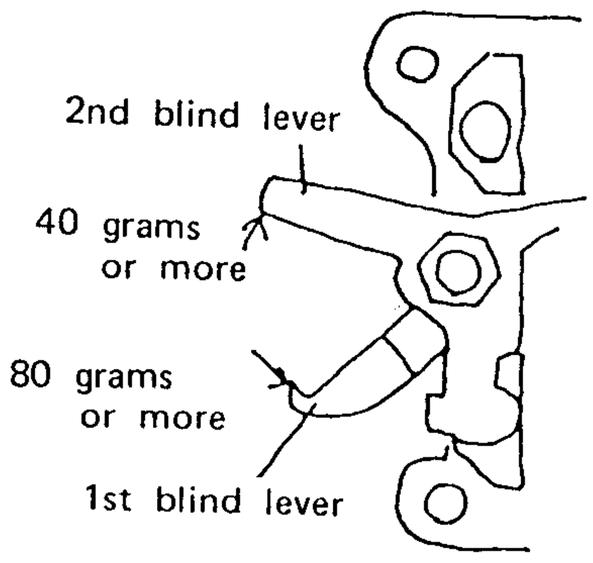
Attracting force



Force required in leaving the 1st blind lever and the 2nd blind lever when the release lever is moved to the position shown by the dotted line.

Fig. 62

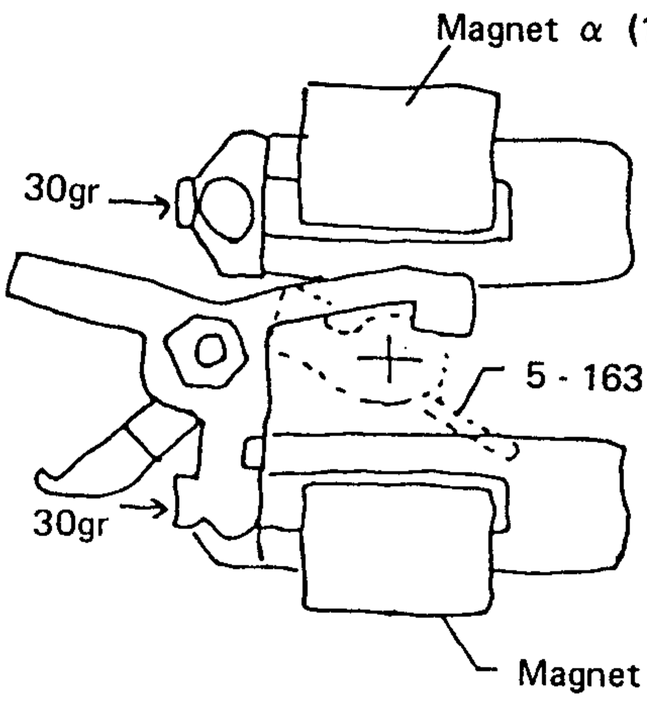
Holding force



Force required in separating the attracted piece from the iron core when a force is applied toward arrow mark direction.
NOTE: The release lever is in the free state.

Fig. 63

Repulsive force



A repulsive force should be generated when 30 grams are applied as shown in the left hand figure to turn the release lever (5 - 163) 30 to 35°.

11. Specifications for time magnet (a content of 5-73)

a. Attracting force: 200 grams or more with DC 3.5V applied.
When this magnet is built in the assembly (5-73), 100 grams or more at the designated point.

b. Holding force: 1st blind lever: 80 grams or more
2nd blind lever: 40 grams or more

c. Repulsive force: With the release lever turned 30 to 35°, 30 grams or more

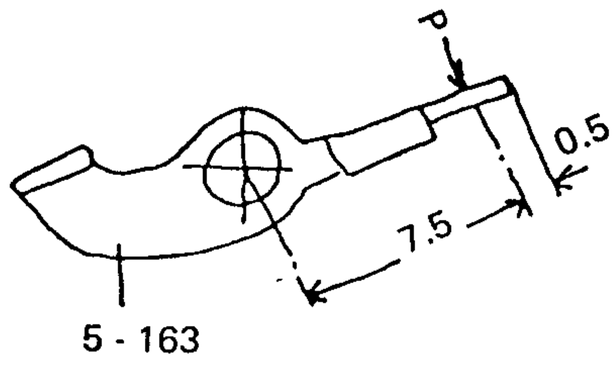
d. Release lever driving force: 110 grams or less

e. Release lever gap: 0.2 to 0.5 mm against the base plate.

f. Claw position: 1/2 to 1/3 engagement against the cam; Should oppose the cam center.

Fig. 64

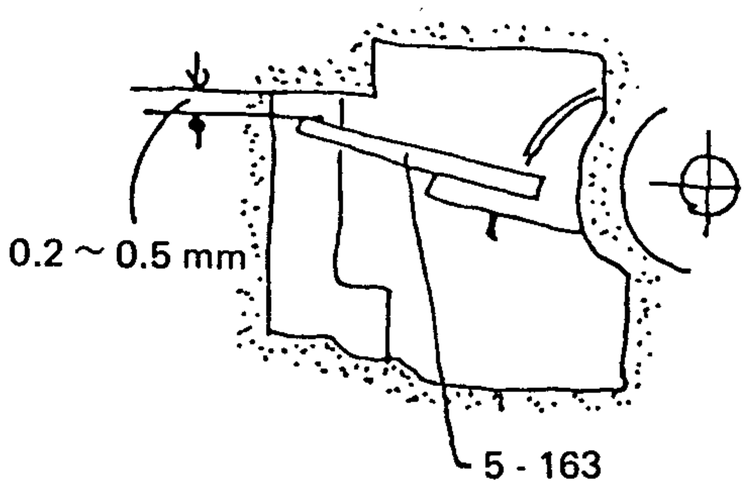
Release lever driving force



Force required in turning the release lever (5 - 163) with the attracted piece attracted.
110 grams (max.)

Fig. 65

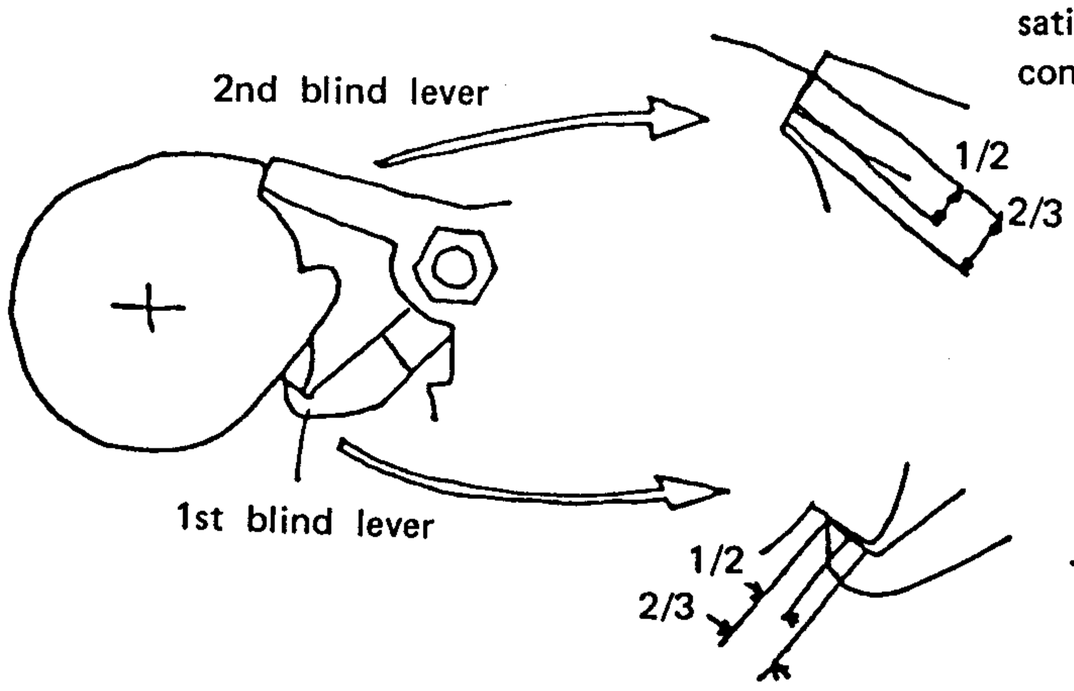
Release lever gap



With the release lever freed, a gap (0.2 to 0.5 mm) should exist against the base plate.

Fig. 66

Claw position



For the deeper side, claw position is satisfactory as long as it does not connect the bottom.

Height